TOWARDS MAKING WORLD-CLASS UNIVERSITIES: CASE STUDY OF THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY

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Abstract: *Characteristics of a world-class university include indicators such as quality of faculty, research reputation, talented undergraduate, international presence, proper usage of resources, alliances and networks, embrace of many disciplines, technologically smart, good management practices, internationalism of all aspects of the university. Thus, economic activity, innovation, international diversity, institutional indicators and research indicators are manifestations of a world-class university. In today's digitally connected world, it is impossible to attain this status without a world-class Information and Communication Technology (ICT) infrastructure. This paper presents impact of ICT activities on universities ranking of three Nigerian universities thus enhancing their quest towards world-class status.*

Key words: *World-Class, Ranking, ICT, e-Learning, Repository, Nigeria*

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1.0 INTRODUCTION

As Nigeria aspires to be one of the top twenty world economies by year 2020, she must have significant educational aspirations. Among these are the quests to raise existing universities to "World Class" stature or to establish "World Class" universities. Characteristics of a world-class university include indicators such as quality of faculty, research reputation, talented undergraduate, international presence, proper usage of resources, alliances and networks, embrace of many disciplines, technologically smart, practice the art of good management, internationalism of all aspects of the university.

Thus, economic activity and innovation, international diversity, institutional indicators, research indicators are manifestations of a world-class university. In today's digitally connected world, it is impossible to attain this status without a world-class Information and Communication Technology infrastructure. This paper presents impact of information and communication technology activities in three Nigerian universities and the improvement of the universities' Webometrics world universities ranking thus enhancing the universities' quest towards world-class status. The three universities studied were:

- University of Nigeria, Nsukka – established in 1960, is one of the oldest public universities with about 40,000 students in four (4) campuses. It has 15 Faculties and over 120 academic departments.

- Federal University Oye-Ekiti – established in 2011, is one of the newest public universities with about 1000 students in 2 campuses. It has four (4) Faculties and 27 departments.

- Covenant University, Ota – established in 2002, is one of the leading private universities in Nigeria with about 9,000 students in one campus. It has nine (9) Schools (or Faculties) and 22 departments.

2.0 WORLD UNIVERSITIES RANKING METHODOLOGIES

University ranking has become a major source of providing indicators and parameter for classifying university performance in teaching and research and therefore identifying world class universities. There are several ranking methodologies:

- Times Higher Education (THE)

- Academic Ranking of World Universities (ARWU)

- Webometrics World Universities Ranking (WR)

2.1 The **UK Times Higher Education** methodology for the 2013-2014 World University Rankings is identical to that used since 2011-2012, offering a year-on-year comparison based on true performance rather than methodological change. The 13 performance indicators are grouped into five areas (THE, 2013):

- Teaching: the learning environment (worth 30 per cent of the overall ranking score)

- Research: volume, income and reputation (worth 30 per cent)

- Citations: research influence (worth 30 per cent)

- Industry income: innovation (worth 2.5 per cent)

- International outlook: staff, students and research (worth 7.5 per cent).

2.2 Academic Ranking of World Universities (ARWU)

The Academic Ranking of World Universities is compiled by Shanghai Jiaotong University. The rankings have been conducted since 2003 and then updated annually and uses six indicators:

Table 1: Indicators and Weights for ARWU (ARWU, 2013)

Criteria	Indicator	Weight
Quality of Education	Alumni of an institution winning Nobel Prizes and Fields Medals	10%
Quality of Faculty	Staff of an institution winning Nobel Prizes and Fields Medals	20%
	Highly cited researchers in 21 broad subject categories	20%
Research Output	Papers published in Nature and Science	20%
	Papers indexed in Science Citation Index-expanded and Social Science Citation Index	20%
Per Capita Performance	Per capita academic performance of an institution	10%
Total		100%

2.3 Webometrics Ranking Web of Universities

(Aguillo, 2009), in his paper attempts to provide an alternative, although complementary, system for the evaluation of the scholarly activities of academic organizations, scholars and researchers, based on web indicators. He found that three large groups of indicators are feasible to obtain and relevant for evaluation purposes: activity (web publication); impact (visibility) and usage (visits and visitors). It observed that ranking results are similar to those obtained by other bibliometric-based rankings; and there is a concerning digital divide

between North American and European universities, which appear in lower positions when compared with their USA and Canada counterparts. (Aguillo, 2006), described the testing of the feasibility of cybermetric indicators for describing and ranking university activities as shown in their Web sites, using a large set of 9,330 institutions worldwide in 2006 rising to over 20,000 in July 2013 edition.

Specically, (Aguillo et al, 2008), presented the Webometric Ranking of Universities using a combined indicator called WR that takes into account the number of published web pages (S) (twenty five percent), the number of rich files, those in pdf, ps, doc and ppt format (R) (12.5 percent), the number of articles gathered from the Google Scholar Database (Sc) (12.5 percent,) and the total number of external inlinks (V) (fifty percent). They suggest that this kind of rankings using web indicators should be used to measure universities' performance in conjunction with more traditional academic indicators. From July 2010 edition the four indicator names were changed as in Table 2 and the definition of the indicators from the July 201o edition are shown below.

Table 2: Webometrics Web Ranking Indicator Names

No	Before July 2010	From July 2010 Edition
1	(S) Web Size (20%)	Presence (20%)
2	(V) Visibility (50%)	Impact (50%)
3	(Sc) Google Scholar (15%)	Openness (15%)
4	(R) Rich Files (15%)	Excellence (15%)

Presence (20%): The global volume of contents published on the university webdomains as indexed by the largest commercial search engine (Google). It counts every webpage, including all the formats recognized individually by Google, both static and dynamic pages.

Impact (50%): The quality of the contents is evaluated through a "virtual referendum", counting all the external in-links that the University web-domain receives from third parties. Those links are recognising the institutional prestige, the academic performance, the value of the information, and the usefulness of the services as introduced in the web pages according to the criteria of millions of web editors from all over the world. The link visibility data is collected from the two most important providers of this information: **Majestic SEO and ahrefs**, that provides an overlapping scenario very close to a true global coverage.

Openness (15%): The global effort to set up institutional research repositories is explicitly recognized in this indicator that takes into account the number of rich files (pdf, doc, docx, ppt) published in dedicated websites according to the academic search engine **Google Scholar**.

Excellence (15%): The academic papers published in high impact international journals are playing a very important role in the ranking of Universities. The data is largely provided by the **Scimago** group.

In a very interesting work, (Ortega et al, 2009), present visual display of the most important universities showing the topological characteristics and describes the web relationships among universities of different countries and continents. Examining the link relationships of the first 1000 higher education institutions using social network analysis techniques found out that the world-class university network is constituted from national sub-networks that merge in a central core where the principal universities of each country pull their networks toward international link relationships. The United States dominates the world network, and within Europe the British and the German sub-networks stand out.

A comparison between ARWU and Webometrics methodologies shows that they differ largely on prestige indicators which are largely subjective.

Table 3: Comparison of the main World Universities' Rankings, 2010

CRITERIA	WR (webometrics)		ARWU (Shanghai)	
Univ's Analyzed	15000		3000	
Univ's Ranked	5000+		500	
Quality of Education			Alumni Nobel&Field	10%
Internazionalization				
Size	Web Size	20%	Size of Institution	10%
Research Output	Rich Files	15%	Nature & Science	20%
	(Google) Scholar	15%	SCI & SSCI	20%
Impact	(Link) Visibility	50%	Highly Cited Res'ers	20%
Prestige			Staff Nobel&Field	20%

2.4 Other international universities rankings are:

- Asia's Best Universities (Asia Week)

- CHE-Excellence Ranking (CHE)

- Global University City Index

- Performance Ranking of Scientific Papers for World Universities (Higher Education Evaluation and Accreditation Council of Taiwan)

- World University Rankings (THES & QS)

3.0 ICT STRATEGY AND ACTION PLAN

We present here the ICT activities resulting from the improved infrastructure of the three universities studied. We discuss the ICT Policy and Strategy Programmes, Virtual Learning Environment, Institutional Repositories, Integrated Business processes and Internationalisation through Global classroom. We begin with the scope of ICT infrastructure development in the three universities.

3.1 ICT Infrastructure

a. **University of Nigeria**: Working with Google Inc, the University drew out a very detailed ICT Strategy Programme. The goal, objectives and scope of the University of Nigeria ICT strategy Programme are designed to transform the University to a world-class university in the shortest possible time. Specific actions for university ranking are detailed in Appendix A. The scope of the ICT strategy programme includes but not limited to the following:

Area	Infrastructure
Internet Connectivity	Provision of a minimum of 310Mbps (2-STM[1]) of Internet Bandwidth starting with 155 Mbps (1-STM).
University Network	A comprehensive, ubiquitous, always-on, wired and wireless network that covers the entire geography of the four campuses of the university.
Central Storage	A storage area network of 400TB (Terabytes) on which students and faculty can store data, but starting with 100 TB.
Data Centre	Tier 2 Data Centre and Network Operating Centre consisting of Servers, cooling system, automatic fire system, surveillance and sophisticated hybrid power backup system of Solar, Inverters, UPS, generators and public power supply.
Power Supply	Dedicated Power Supply of the order of 1MW preferably from renewable power source such as solar.
Virtual Super Computing	Virtual Super Computing facility will be required that can be used for modeling, rendering of bioinformatics and computer intensive research as well as e-Business.
Pedagogy and	Use of Open source software to drive a new digital environment for

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[1] STM-1 refers to a transmission format used in fiber optic networks. STM-1 is an abbreviation for Synchronous Transport Module level-1. It has a bit rate of 155.52 Mbit/s.

Administration	teaching, learning and research.
Student and Staff Computing	Each Staff and student will be encouraged to have a computer (preferably a mobile computer) of a minimum configuration of 2GB RAM at least 250 GB HDD which is internet-ready.
Integrated Local Intercom/Voice Service	In locations selected by the University, provision of a packet based voice service (VoIP).
Call Centre and Hardware Repair Centre	Establishment of a call centre to manage communication between teams and users and a hardware repair centre of Laptops, Note books and PCs
ICT Resource Centre	Comprehensive ICT Resource Centre consisting of Webinar rooms, networking rooms, software rooms, hardware rooms for **teaching**; global classrooms, e-learning laboratories, international certification centres for **learning**; software and hardware testing laboratories, data analysis centre, imaging and printing room, document management centre, videoconferencing rooms for **research**; infrastructure rooms for data storage, network operating centre, maintenance and repair shop, call centre and charging bay

b. Covenant University: Working with Google Inc and the University taskforce on University Ranking, they drew out a very detailed ICT Strategy Programme. Covenant University, an ICT-driven university, with estimated active ICT users of about 10,000 will require the following minimum ICT infrastructure:

Last Mile	Optical fibre cabling from the nearest point of presence of one or two Internet Service Providers such as Glo Communication Networks Ltd or Main One Cables Ltd.
Internet Bandwidth	Bandwidth density is 10-15 Mbps per 1000 active users (students and staff). The recommended bandwidth density for 10,000 active users is therefore 1 STM (155 Mbps). Terrestrial bandwidth will be preferred.
University Network	A comprehensive, ubiquitous, always on wired and wireless network that covers the entire geography of Covenant University.
Central Storage	A storage area network of at least 400-600 TB (Terabytes) on which students and faculty can store data is recommended.
Data Centre & Network Operating Centre	A Tier-II Data Centre comprising of the Network Operating Centre with Network Management System, Routers, Switches, Firewall, Power Protection and Backup System, Access Control, Fire Detection and Suppression, Cooling System, Surveillance System, Central Storage.
Data Resource Centre	Comprehensive ICT Resource Centre consisting of Webinar rooms, networking rooms, software rooms, hardware rooms for teaching; global classrooms, e-learning laboratories, international certification centres for learning; software and hardware testing laboratories, data analysis centre, imaging and printing room, document management centre, videoconferencing rooms for research; infrastructure rooms for data storage, maintenance and repair shop, call centre.
Dedicated Power Supply	Dedicated Power supply of the order of 1MW preferably from renewable power source such as Solar.
High Performance Computing	High Performance Computer facility will be required that can be used for modelling, rendering, bioinformatics and computer intensive research.

Integrated Business Process using E-Business Solutions	To provide the information robustness required as the University works towards becoming a world-class university, the information management must be run on an integrated enterprise solution that integrates the University business processes in procurement, operations, planning, project management, student lifecycle management, customer service, asset management, financial accounting, human resources, and analytics application.
Call Centre	A 24x7 call centre to manage communication between teams and users. The call centre will be equipped with the latest state-of-the-art communications facilities.

c. **Federal University Oye-Ekiti:** The founding management resolving to make the university an ICT-driven university developed an ICT Policy with an event-driven ICT implementation plan. The ICT Policy covers the following areas:

- Application of ICT in Education

- Application of ICT in Administration

- Infrastructure

- Network development and management

- Access management and control

- Capacity Building

- Equal Opportunities Guidelines

- Maintenance of ICT Facilities

- Collaborative Services and Resource Sharing

- World universities Ranking

For the implementation process, an event-driven approach was adopted. There are a total of 128 activities or milestones to be completed during the 36 months life of the Policy (FUOYE, 2012). Overview of the ICT Policy implementation plan is shown in Appendix B.

The implementation work breakdown structure is grouped into 12 quarters as follows:

Quarters	Period	No of Milestones
Q4-2012	October-December 2012	17
Q1-2013	January-March 2013	27
Q2-2013	April-June 2013	19
Q3-2013	July-September 2013	18
Q4-2013	October-December 2013	13
Q1-2014	January-March 2014	7
Q2-2014	April-June 2014	5
Q3-2014	July-September 2014	6
Q4-2014	October-December 2014	5
Q1-2015	January-March 2015	5
Q2-2015	April-June 2015	3
Q3-2015	July-September 2015	2
Q4-2015	October-December 2015	1
TOTAL Milestones		**128**

3.2 Virtual Learning Environment

a. **University of Nigeria:** The University of Nigeria established a vibrant Virtual Learning Environment using open-source, Learning Management System, Moodle. Over 400 Academic staff members were trained and were required to convert part of their course to an e-Learning platform. By the end of 2010, over 200 courses were in various stages of development (Figure 1). An e-learning Intranet was also developed for the General Studies.

Figure 1: University of Nigeria e-Learning Portal http://learn.unn.edu.ng

b. **Covenant University:** Established a vibrant Virtual Learning Environment using open-source, Learning Management System, Moodle.

c. **Federal University Oye-Ekiti:** Has an e-learning platform using open-source, Learning Management System, Moodle. It is very active with tens of courses and tutorials for students.

3.3 Online Institutional Repository

a. **University of Nigeria**: as at December 27, 2013, over 21,000 documents have been digitized and uploaded to the University online repository at **http://unn.edu.ng/chart/repo**. The repository is registered under the **OpenDOAR - Directory of Open Access Repositories**. This is the largest online academic repository in

any Nigerian University. The repository contains about 10,000 University of Nigeria PhD, Masters, selected Bachelors Theses and University owned academic publications. The breakdown is shown in the table below:

Table 4: Breakdown of Digitised and Uploaded Documents on Repository

(http://unn.edu.ng/chart/repo)

Category	Number of Documents
Arts	1,048
Agriculture	2,361
Biological Sciences	749
Business Administration	3,229
Dentistry	0
Education	5,609
Engineering	811
Environmental Studies	429
Health Sciences and Technology	300
Law	42
Medicine	1,894
Pharmaceutical Sciences	659
Physical Sciences	796
Social Sciences	2,836
Veterinary Medicine	402
Others	294
TOTAL	**21,459**

b. **Covenant University**: Covenant University has two Institutional Repositories using open source Dspace and Eprints software. The repositories with thousands of documents are both registered under the **OpenDOAR** - Directory of Open Access Repositories and are accesses at http://eprints.covenantuniversity.edu.g/ and http://dspace.covenantuniversity.edu.ng/

c. **Federal University Oye-Ekiti**: has one Institutional Repository using open source Dspace software. The repository can be accesses at http://repository.fuoye.edu.ng

3.4 Integrated Business Processes

To provide information robustness required towards becoming a world-class university, the information management must be run on an integrated enterprise platform that integrates the University business processes in procurement, teaching, planning, project management, student lifecycle management, asset management, logistics, financial accounting, human resources, and analytics application.

a. **University of Nigeria**: All university business process are been implemented using SAP and SAGE ERP solutions.

b. **Covenant University**: All university business process are been implemented using SAGE ERP solutions

c. **Federal University Oye-Ekiti**: All university business process are been implemented using open source solution, OpenERP.

3.5 Internationalisation through Global Classroom.

a. **University of Nigeria**: Created global classroom for teaching and learning with several overseas universities including the Earth Institute, USA, as well as with top Nigerians in the Diaspora.

b. Covenant University: Established international Linkages with close to 30 Universities and world-class organizations. It is a member of the East Carolina University Global Understanding Initiative.

c. Federal University Oye-Ekiti: Established a Webinar room for teaching and learning from across the globe.

3.6 Other Areas of Action

Other areas of action which the three universities are actively pursuing are:

- Employment and student admission policy encourages the employment of International and Overseas faculty and admission of international students. This will improve the International Diversity of the University.

- Raising the level of the Research and Institutional Indicators such as Academic papers, Research income, ratio of PhD/undergraduate degrees and PhD awarded.

- Commercialisation of research by their respective Innovation Centres thus assisting in attracting funds for PhD research.

- Increasing collaboration and linkages with both international and national universities and research institutions.

4.0 RESULTS AND DISCUSSIONS

The ranking history of the three universities on the Webometrics World Universities Ranking since they became focused on it is shown in the table below. The results show dramatic improvements in global ranking of the three universities.

a. **University of Nigeria**: In the July 2010 Webometrics World ranking, the University of Nigeria was ranked, for the first time ever, amongst the top 100 African Universities. It is today occupying the 31st position in Africa (Webometrics July 2013 edition).

b. **Covenant University**: was ranked amongst the top 100 African universities for the first time, in July 2011. (Webometrics, 2011)

c. **Federal University Oye-Ekiti**: has consistently toped the table of all the 12 new universities established by the Federal Government of Nigeria from year 2011 (Webometrics, 2012 and 2013 editions).

Table 5: Ranking[2] History of Universities Studied (www.webometrics.info, various years)

Date	University of Nigeria (UNN)	Covenant University (CU)	Federal University Oye-Ekiti (FUOYE)
Jul 2008	15,000+		
Jan 2009	13,000+		
Jul 2009	10,340		
Jan 2010	8,285		
Jul 2010	**7,170**	9320	
Jan 2011	5176	8835	
Jul 2011	5396	**7169**	
Jan 2012	3228	7730	
July 2012	4032	5491	15034
Jan 2013	2827	4289	12476
Jul 2013	2640	7856	12140
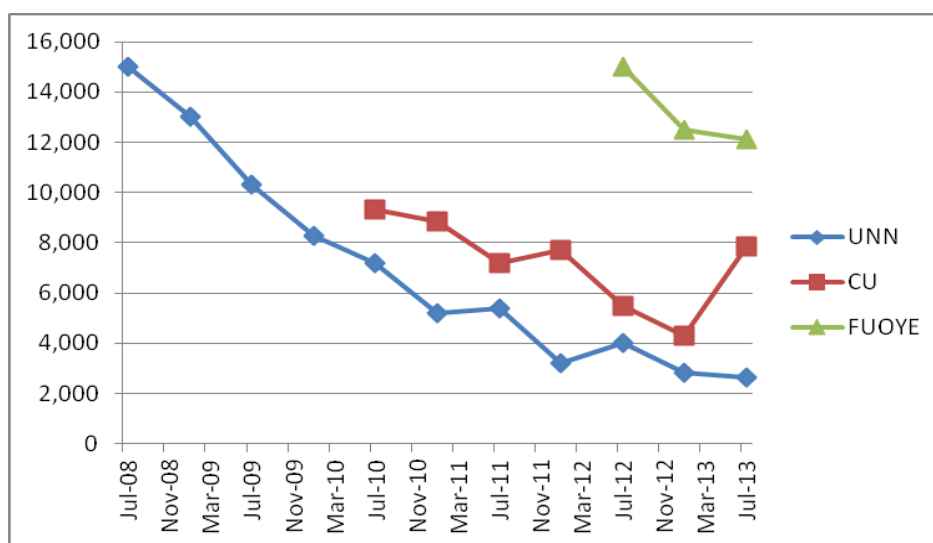
Figure 2: Improved Ranking Trend for UNN, CU and FUOYE (out of over 20,000 HEIs)

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[2] Lower is better

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APPENDIX A

Source: Proceedings of Deans and Associate Deans Workshop on Action Plan on World Universities Ranking, March 29, 2010

a. External Links (Ranking Weight-50%)

	Action
1	Every department to formalize their external research collaboration by requesting the collaborating university or research organization to include UNN web address www.unn.edu.ng on their website
2	Internet access should be given to faculties to allow staff members stay longer hours on the web for research.
3	The university website or the university domain should be redesigned to enable researchers/ faculty members to archive their publications or formally upload them to the web.
4	Alumni members and Staff members should be encouraged to create personal but academic websites or blogs with links to UNN domain.
5	Web pages of staff of the University should be created. Template should be made available to staff to provide personal information, research interests, publications, etc,
6	Staff should be compelled to use the University domain name and email address for their research, contacts and communication. Sanctions and/or incentives should be provided to ensure that the action plan is implemented.
7	Creation of more meta-tags on the university website

b. Web Pages (Ranking Weight-20%)

	Action
8	Creation of sites for different associations in the university using a template with a university appointed moderator
9	Information on every staff of a faculty should be documented and put on the web using a template
10	The library website should be linked to the University domain
11	Mandatory submission of weekly News Items for publication on the Web by Faculties
12	University Repository and E-Learning portal should be made to be a sub-domain of the university domain

c. Rich Files (Ranking Weight-15%)

	Action
13	All final copies of undergraduate, Diplomas, Masters & PhD theses must be submitted in specified electronic format to the Post Graduate School and the Library The library copy must be digitally signed, book-marked before depositing into the university digital Repository. Upload must be done within 30 days of submission
14	All publications for assessment should be deposited into the university digital Repository in line with University Web Publishing Policy.
15	There should be a policy to ensure that all faculty journals are web-based.
16	University should make research grants available to staff and reports of such funded research efforts should be uploaded to the web.
17	Procurement and use of technologies that could scan old document, and upload them directly to the web such as the retrospective conversion of the library catalogue. Existing process to be intensified

d. Google Scholar (Ranking Weight-15%)

	Action
18	All academic publications must contain the University domain as meta tag
19	To get online publications of staff to begin to count in Google Scholar scoring and the university appraisal system.
20	Access should be provided to staff to enable them upload their publications and personal information to the web.

e. Usability & Policy

	Action
21	Roadmaps for the university website specifying very clearly how to obtain information on every aspect of the university life
22	Define the University of Nigeria Web Policy
23	Produce the UNN Corporate Identity Manual Re-design UNN Website to reduce Bounce Rates

APPENDIX B

Table 6: ICT Policy Implementation Plan, FUOYE

#	ACTIVITIES	2012	YEAR 2013				YEAR 2014				YEAR 2015			
		Q4-12	Q1-13	Q2-13	Q3-13	Q4-13	Q1-14	Q2-14	Q3-14	Q4-14	Q1-15	Q2-15	Q3-15	Q4-15
A	VISION & MISSION													
1	Discussions of ICT Policy Document	1												
2	Approval of the Minimum Guidelines Document	1												
B	APPLICATIONS OF ICT TO EDUCATION DELIVERY AT FUOYE													
3	E-books/e-journals - subscriptions, ScienceDirect, etc	14	14											

#	Item													
4	E-Assessment/E-Testing - Moodle	15	15											
5	E-learning - Moddle	16	43											
6	Voice and Video Cconferencing- BigBlueButton, Google+				64	81								
7	E-collaboration - Google+, Google hangout, Google Apps					82								
8	Plagiarism Policy -approval	2												
9	Plagiarism Software - TurnItin, http://www.plagtracker.com/			44	65									
C	**APPLICATIONS OF ICT TO ADMINISTRATION IN FUOYE**													
10	Identification - Biometrics RFID				65	83								
11	Integrated Business Process using E-Business Solutions						94	101	106	112	117			
12	Physical Planning - Georeferencing-GIS				66	84	95							
13	Electronic Mail Policy Enforcement	0			67	85	96							
14	e-Government: Digital Document Management System		17	45	68	86	97							
D	**INFRASTRUCTURE**													
15	Last Mile -OFC						98	102						
16	Internet Bandwidth	3												
17	University Network - Wireless	4	18	46	69	87								
18	University Backbone - Optical Fibre Cabling (OFC)					88	99	103	107	113				
19	Central Storage							104	108					
20	Data Centre & Network Operating Centre	5	19	47	70				109	114	118			
21	Data Resource Centre								110	115	119	122		
22	Dedicated Power Supply				71	89								
23	High Performance Computing										120	123	125	
24	Integrated Business Process using E-Business Solutions						100	105	111	116	121	124	126	127
25	Call Centre	6	20											
E	**NETWORK DEVELOPMENT AND MANAGEMENT POLICY**													
26	General Network Policy		21											
27	Campus Area Networks		22	48	72									
28	Inter-Campus Networks		23	49	73									
29	Private Networks				74									
30	External access to servers on the backbone network				75									

#	Activities	Q4-12	Q1-13	Q2-13	Q3-13	Q4-13	Q1-14	Q2-14	Q3-14	Q4-14	Q1-15	Q2-15	Q3-15	Q4-15
31	Data Protection Policy - approval		24	50										
32	Back Up and Disaster Recovery Plan	7	25	51										
F	ACCESS MANAGEMENT AND CONTROL													
33	Physical Access Control Policy - approval		26											
34	Usage Policy - approval		27											
35	Antivirus Policy - approval		28											
36	Anti-Piracy Policy	8	29											
37	Maintenance Policy - approval		30											

#	ACTIVITIES	2012	YEAR 2013				YEAR 2014				YEAR 2015			
		Q4-12	Q1-13	Q2-13	Q3-13	Q4-13	Q1-14	Q2-14	Q3-14	Q4-14	Q1-15	Q2-15	Q3-15	Q4-15
G	CAPACITY BUILDING													
38	ICT Literacy Campaign	9	31	52	76	90								
39	Technical Team Training		32	53	77	91								
40	Training Resources	10	33											
41	E-Learning Policy - approval		34											
H	EQUAL OPPORTUNITIES GUIDELINES													
42	Accesibility Policy - enforcement		35											
43	Gender / Ethnic / Religious Issues Policy enforcement		36											
I	MAINTENANCE OF ICT FACILITIES													
44	Inventory of ICT Facilities - (digital, geo-refrenced, etc)	11	37											
45	Hardware Maintenance Management Policy approval		38											
46	Repair Centres	12	39	54										
J	COLLABORATIVE SERVICES AND RESOURCE SHARING													
47	Sharing of Infrastructure & Resources Policy		40											
48	Physical Connection			55	78	92								
49	Hosting services			56										
50	Remote Laboratory activities			57										
51	Computer-supported collaborative learning			58										
52	Tele-participation			59										
53	Collaborative Capacity Building			60										
K	WORLD UNIVERSITIES RANKING													
54	Presence	13	41											
55	Openness		42	61										
56	Excellence			62	79	93								
57	Impact			63	80									